

Customer No.: 31561
Application No.: 10/710,405
Docket No.: 13302-US-PA

REMARKS

Present Status of the Application

The Office Action rejected all presently-pending claims 1-26. Specifically, the Office Action rejected claims 1-5, 7, 9-12 and 14 under 35 U.S.C. 102(e), as being anticipated by Barth et al. (US 6,737,747). The Office Action also rejected claims 6 and 13 under 35 U.S.C. 103(a) as being unpatentable over Barth in view of Edelstein (US 2005/0194619). The Office Action rejected claims 1, 4, 5, 7-9, 12, 14 and 15 under 35 U.S.C. 102(e), as being anticipated by Dalton et al. (US 6,734,096). The Office Action also rejected claims 6 and 13 under 35 U.S.C. 103(a) as being unpatentable over Dalton in view of Edelstein. The Office Action also rejected claims 16-19 and 25 under 35 U.S.C. 102(e), as being anticipated by Lee et al. (US 2005/0221606). The Office Action rejected claims 20-22 and 24 under 35 U.S.C. 103(a) as being unpatentable over Lee. The Office Action also rejected claims 23 and 26 under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Dalton.

Applicants have amended claims 1 and 3 and canceled claims 2 and 9-26 to more clearly define the present invention. Applicants have also newly added claims 27-35. After entry of the foregoing amendments, claims 1, 3-8 and 27-35 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Rejection under 35 U.S.C 102 (c)

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The Office Action rejected claims 1-5 and 7 under 35 U.S.C. 102(e), as being anticipated by Barth et al. (US 6,737,747). The Office Action rejected claims 1, 4, 5 and 7 under 35 U.S.C. 102(e), as being anticipated by Dalton et al. (US 6,734,096). Applicant respectfully traverses the rejections for at least the reasons set forth below.

In order to properly anticipate Applicants' claimed invention under 35 U.S.C 102, each and every element of claim in issue must be found, "either expressly or inherently described, in a single prior art reference". "The identical invention must be shown in as complete details as is contained in the claim. Richardson v. Suzuki Motor Co., 868 F. 2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." See M.P.E.P. 2131, 8th ed., 2001.

The present invention is in general related a process of fabrication a semiconductor structure as claim 1 recites:

Claim 1. A process of fabrication a semiconductor structure, comprising:
providing a substrate;
forming a dielectric layer over the substrate;
forming a hydrophilic material layer over the dielectric layer, wherein residuals are formed on an edge of at least one of the substrate, the dielectric layer, the hydrophilic material layer or a combination thereof;
performing a polish process on the edge of at least one of the substrate, the dielectric layer, the hydrophilic material layer or a combination thereof to remove the residues; and
forming a hardmask layer over the hydrophilic material layer.

Barth fails to disclose, teach or suggest the process comprises a step of ***performing a polish process on the edge of at least one of the substrate, the dielectric layer, the hydrophilic material layer or a combination thereof to remove the residues.*** Barth discloses excess liner 114 and conductive material 115 may be removed in a CMP process, in which the top surface of

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conductor 115 is made coplanar with the hardmask layer 113. Hardmask layer 113 may serve as a polish-stop layer during this CMP step, thereby protecting ILD layer 112 from damage during polishing. Usually, the CMP process is a fully planarization process and thus the top surface of conductor 115 is made coplanar with the hardmask layer 113 (see col. 9, lines 34-40). However, Barth does not teach or suggest performing a polish process only on **the edge of layers**. In claim 1 of the present invention, the polish process is performed on the edge of at least one of the substrate, the dielectric layer, the hydrophilic material layer or a combination thereof to remove the residues remained there. According to embodiments of the present invention, the polish process can be an upper bevel polish, a lower bevel polish, a side polish or a combination thereof as claim 2 recited and Fig. 3 shown. The polish process of claim 1 is performed on the edges of the resulted structure but not on the fully top surface of the resulted structure. Therefore, Barth does not teach each and every element in claim 1.

In addition, Dalton also fails to disclose, teach or suggest the process comprises a step of *performing a polish process on the edge of at least one of the substrate, the dielectric layer, the hydrophilic material layer or a combination thereof to remove the residues*. Dalton teaches a method for forming a metal pattern in a dielectric layer. In particular, a CMP process is also conducted to remove the excess metal (see Fig. 2F-2G and col. 4, lines 40-50). Similarly, the CMP process disclosed by Dalton is performed on the top surface of the metal layer. The citation fails to teach or suggest a polish process is performed only on the edge of the resulted structure. Therefore, Dalton does not teach each and every element in claim 1.

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For at least the foregoing reasons, Applicants respectfully submit that independent claims 1 patentably define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 3-5 *and* 7 patentably define over the prior art as a matter of law.

Rejection under 35 U.S.C 103 (a)

Applicants respectfully traverse the rejection of claim 6 under 103(a) as being unpatentable over Barth in view of Edelstein (US 2005/0194619) because a prima facie case of obviousness has not been established by the Office Action.

To establish a prima facie case of obviousness under 35 U.S.C. 103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must teach or suggest each and every element in the claims. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of the three requirements must "be found in the prior art, and not be based on applicant's disclosure." See M.P.E.P. 2143, 8th ed., February 2003.

Applicants submit that, as disclosed above, Barth fails to teach or suggest each and every element of claim 1 from which claim 6 depends. Edelstein also fails to teach or suggest a step of performing a polish process on the edge of at least one of the substrate, the dielectric layer, the hydrophilic material layer or a combination thereof to remove the residues. Edelstein cannot cure the deficiencies of Barth and Edelstein. Therefore, independent claim 1 is patentable over Barth and Edelstein. For at the least the same reasons, their dependent claim 6 is also patentable.

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Newly added claims

Applicants added claims 27-35, wherein claim 27 is an independent claim. Claim 27 comprises the step of performing a first polish process on the edge of at least one of the substrate, the first dielectric layer, the first hydrophilic material layer or a combination thereof to remove the first residues and the step of performing a second polish process on the edge of at least one of the substrate, the first dielectric layer, the first hydrophilic material layer, the second hydrophilic material layer or a combination thereof to remove the second residues. The citations cited in the Office Action do not teach or suggest the features.

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CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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Respectfully submitted,

Belinda Lee
Belinda Lee

Registration No.: 46,863

Jianq Chyun Intellectual Property Office
7th Floor-I, No. 100
Roosevelt Road, Section 2
Taipei, 100
Taiwan
Tel: 011-886-2-2369-2800
Fax: 011-886-2-2369-7233
Email: belinda@jicigroup.com.tw
Usa@jicigroup.com.tw